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# The EPPM put to the test

## Evaluating four basic propositions

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*Fear appeals are frequently used in health communication, for example in anti-smoking campaigns. Of the different theoretical models that predict and explain how fear appeals work, the Extended Parallel Process Model (EPPM; Witte, 1992) is probably used most often. However, most propositions of the EPPM were not explicitly tested, or received mixed empirical support (Popova, 2012).*

*To clarify the relationships between the variables of the EPPM, four of the EPPM's propositions were tested by performing correlational and mediation analyses. The results (n = 116) show that a large part of the relationships between the concepts of the EPPM and the outcomes of fear appeals differ from what the EPPM claims: threat and intention did not prove to be related, threat did not mediate the effect of fear on intention, and fear did not prove to influence the fear control responses. The findings from this study raise questions regarding the appropriateness of the EPPM.*

### 1. Introduction

By depicting the negative consequences of a specific health behavior, practitioners of health communication try to frighten people into following the desired action (e.g. use a condom). Fear appeal messages are often inspired by the Extended Parallel Process Model (EPPM). Both advertisers and health communication professionals base their message decisions on the EPPM (Popova, 2012). The cigarette warning labels in Canada, for example, are guided by the EPPM (Goodall & Roberto, 2008). Witte (1992) developed this model to predict and explain how fear appeals work.

The EPPM posits that fear appeals can have a persuasive effect, but only under certain conditions (see Figure 1). Firstly, receivers must perceive the threat that is depicted as severe (perceived severity) and they must feel vulnerable to the threat (perceived susceptibility). Secondly, receivers must believe that the recommended action is effective in preventing the threat (perceived response efficacy) and that they are able to perform the action (perceived self-efficacy). When both perceived threat and perceived efficacy are high, receivers are expected to accept the message and consequently to perform the desired action to avert the threat. This is called “danger control”. When perceived threat is high but perceived efficacy is low, receivers may engage in “fear control”: they become motivated to avert the fear by, for example, minimizing the message instead of deterring the threat. When for some reason perceived threat is low, receivers are likely to stop processing the message before even considering the efficacy of the recommended action.

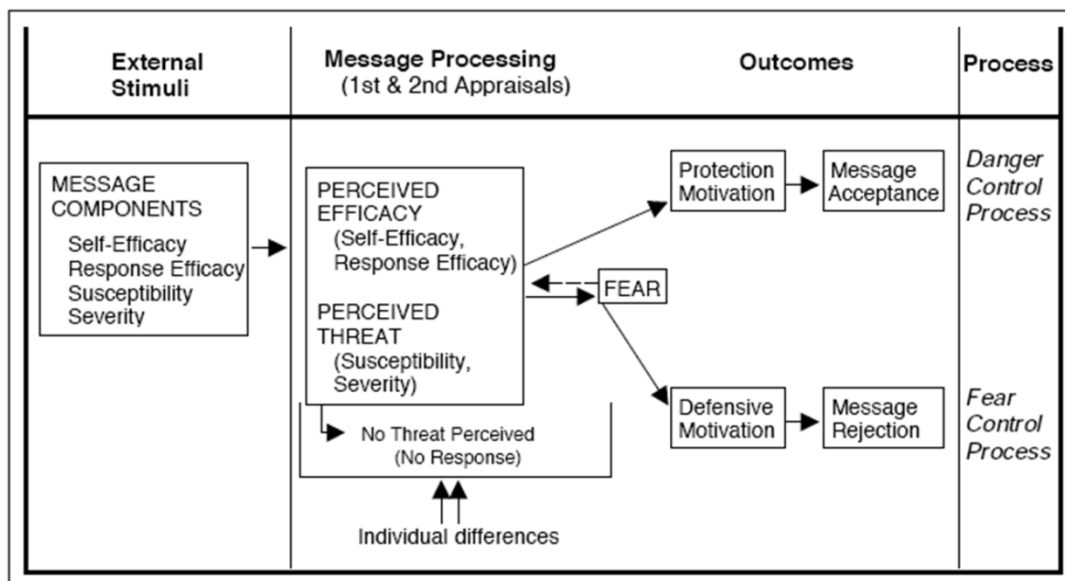


Figure 1. The Extended Parallel Process Model (Witte, 1998)

The EPPM is based on twelve propositions (Witte, 1992, 1998), which are listed in appendix A. Popova (2012) recently reviewed all propositions of the EPPM in order to investigate to what extent the EPPM has received empirical support. Popova included twenty-nine studies in her analysis that had tested at least one of the propositions. She concludes that none of the EPPM's propositions has received unequivocal support. Furthermore, she notes that about half of the propositions had not

been extensively tested yet or had been operationalized incorrectly. Popova concludes that mixed support was found for most propositions. One of the reasons Popova gives for these mixed findings is that the propositions have often been tested with threat and efficacy manipulated as message features instead of measured as actual perceptions. Even when threat and efficacy are not manipulated to be either high or low, the variables have usually been treated as categorical variables through median split. Most of the propositions, however, refer to continuous variables, for example “when threat increases, so will message acceptance”. Therefore, Popova (2012) suggests to use perceptions of threat and efficacy instead of treat them as characteristics of the message, and to analyze the data using correlational and regression analyses.

Following Popova’s suggestions, we conducted a correlational study in which we focused on four propositions of the EPPM that have already been tested but received mixed support. Propositions that would require experiments or equivalence testing are left out in this study, because this study was set up as a correlational study. Each proposition refers to a specific relationship between the concepts of the EPPM and can therefore be examined separately (cf. Witte, 1992; Popova, 2012). Table 1 lists the propositions that are examined in this study (see Appendix A for complete listing of the propositions). They are elaborated in the following section.

*Table 1. Abbreviations of the EPPM’s propositions examined in this study*

Proposition 2	If efficacy is high, threat → danger control
Proposition 6	Fear → fear control
Proposition 7	If efficacy is high, fear → threat → danger control
Proposition 12	Individual differences → threat and efficacy → danger control and fear control

Proposition 2 posits that, when efficacy is high, greater threat leads to greater message acceptance. According to Popova (2012), a number of studies found that high threat indeed resulted in higher

attitudes and intentions for groups high in efficacy. In a more recent study, Popova (2013) herself found that for smokers with high levels of efficacy, higher perceived threat was related to less favorable attitudes toward the relatively new smokeless tobacco product *snus* and lower intentions to try snus. Other studies, however, found no effect of threat on danger control responses. Thus, the relation between threat and danger control responses remains unclear.

The EPPM further claims that threat mediates the relation between fear and danger control responses (proposition 7). Here, Witte (1998) assumes that fear can be *indirectly* related to danger control responses because fear can lead to the upgrade of perceptions of threat (see feedback loop in Figure 1: fear → perceived threat → danger control). This would only hold true, however, under the condition that efficacy is high; when efficacy is low, fear will lead to fear control responses (Witte, 1998). Although Popova (2012, p. 464) reports that some researchers found evidence for the proposed relationship between fear and intentions with threat as mediator, others found a direct effect of fear on intentions.

Mixed support was also found for the proposition concerning the relation between fear and fear control responses. Witte claims that fear causes fear control responses (proposition 6), which is indicated in Figure 1 by the direct arrow from fear to defensive motivation leading to a fear control process. Popova (2012, p. 464) reports that some fear control responses were indeed related to fear, while others were not.

The last proposition examined here concerns the role of individual differences. According to Witte, “individual differences influence outcomes indirectly, as mediated by perceived threat and efficacy” (proposition 12). As there are many individual characteristics that can influence the perceptions of threat and efficacy, it is not surprising that mixed support was found for this proposition (Popova, 2012, p. 466). One individual characteristic that was often studied is trait anxiety, “one’s characteristic level of anxiousness in response to a threat that leads one to react in either an avoidant or coping manner” (Witte & Morrison, 2000, p. 6). Research by Witte and

Morrison suggests that trait anxiety does not affect attitude and intentions, but findings on this issue are inconsistent (Witte & Morrison, p. 9).

The present study aims to clarify the relationships between the EPPM-variables. The following research question is addressed: *Are threat, efficacy, fear, and trait anxiety related to the outcomes of fear appeals as proposed in propositions 2, 6, 7 and 12?*

To answer this question, a correlational study was conducted and mediation analyses were performed.

## **2. Method**

### **2.1. Materials**

In this study, we used a fear appeal in the form of a narrative. Narratives can facilitate the arousal of strong emotions, like fear, by transporting the receiver into the story (Green & Brock, 2000). When receivers read or watch a story, they may lose themselves into the story and become involved with the character, through which receivers can be affected by the emotions of the character. This emotional experience is called transportation (Moyer-Gusé, 2008), and, as Moyer-Gusé (2008) puts it, “because of the engaging structure of a narrative, viewers may be uniquely willing to attend to messages that are personally fear inducing to them in a way they otherwise would not” (p. 417-418).

We created a Dutch narrative fear appeal aimed at females (see Appendix B for a version translated into English), based on Morman (2000). Our narrative tells the story of a student who refused to perform a breast self-exam. The girl discovers she has breast cancer only in a later stage of development and has to deal with severe consequences. In the last paragraph, the girl advises other young females to perform the self-exam every month, in order to detect breast cancer in an early stage. Additionally, information is provided on how to perform the self-exam. This information is

intended to promote high levels of perceived efficacy, which is required for tests of some propositions.

Pretests showed that the story was perceived as credible, understandable, and fear-arousing, as the mean scores of these variables were numerically at least above the midpoint of the scales that were used. This also applied to the level of perceived efficacy, which suggests that the story was able to create perceptions of efficacy.

## **2.2. Participants and procedure**

The study was conducted in two undergraduate classes at the Faculty of Arts of the University of Groningen (the Netherlands). A questionnaire was distributed that consisted of a cover page with instructions, the narrative fear appeal, questions measuring the dependent variables, and personal questions about the participant. It took participants approximately 15 minutes to complete the questionnaire. Participants were debriefed in a follow-up lecture.

In total, 116 female first-year students of the University of Groningen participated in the study. The mean age of the participants was 19.23 years ( $SD = 1.61$ ). On a five-point scale, the participants reported an average level of prior knowledge about breast cancer of 3.37 ( $SD = 0.82$ ).

## **2.3. Measures**

### **2.3.1. Fear**

The statement 'While reading the story, I felt ...' was presented, followed by two items<sup>1</sup> for each emotion. Along with fear, the emotion of anxiety was measured, as suggested by So (2013), who argues that the susceptibility component of threat (Am I vulnerable to the health risk?) involves uncertainty which often evokes anxiety. Anxiety differs from fear, in that fear is evoked by a concrete

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<sup>1</sup> All items were formulated in Dutch. Here, the approximate English translations are presented.

stimulus and anxiety is not. An anxious person does not know where his/her ominous feeling comes from (Rachman, 2004, p. 5).

For fear, the items 'afraid' and 'scared' were used, as was done in, for instance, Dillard et al. (1996). Following So (2013), who suggests to measure anxiety with words that express the feeling of tensions, nervousness, and worry, for anxiety the items 'worried' and 'tensed' were used. The response scales ranged from strongly disagree (1) to strongly agree (7).

After data collection, we subjected the items to a principal components analysis. The analysis extracted one factor (eigenvalue > 1), explaining 73% of the total variance. As the Cronbach's alpha for all four items was more than satisfactory ( $\alpha = .88$ ), we decided to take the four items together and not take fear and anxiety separately. We labeled this factor 'fear'.

### *2.3.2. Threat and Efficacy*

The Risk Behavior Diagnosis (RBD) Scale, developed by Witte, Cameron, McKeon and Berkowitz (1996), was used for the measurement of the perceived threat and efficacy components. The first component of threat, severity, was measured with three items: 'I believe breast cancer is severe', 'I believe that breast cancer is serious' and 'I believe that breast cancer is significant' ( $\alpha = .70$ ). The second component of threat, susceptibility, was measured with the items 'I am at risk of getting breast cancer', 'It is likely that I will get breast cancer' and 'It is possible that I will get breast cancer' ( $\alpha = .91$ ). Threat was defined as the mean score of severity and susceptibility, following the EPPM. Again, the response scales ranged from strongly disagree (1) to strongly agree (7).

Self-efficacy was measured with three items: 'I am able to perform self-exams to detect breast cancer', 'Performing self-exams is easy to do to detect breast cancer' and 'I can perform self-exams to detect breast cancer' ( $\alpha = .90$ ). Response efficacy was measured with two items in conformity with the RBD scale: 'Performing self-exams works in detecting breast cancer in an early stage' and 'Self-exams are effective in detecting breast cancer in an early stage'. The third response efficacy item of the RBD scale says 'If I [do recommended response], I am less likely to get [health



threat]'. This statement, however, cannot be applied to breast cancer: self-exams are used to detect the disease but cannot prevent it. That is why for response efficacy two items from Rutter, Verplanken, De Cremer and Kok (2004) were added: 'The performance of self-exams will increase the chances to detect breast cancer in an early and treatable stage' and 'Detecting breast cancer early strongly improves the chances of being cured'. Cronbach's alpha for all four items was satisfactory ( $\alpha = .68$ ). Efficacy was defined as the mean score of self-efficacy and response efficacy, following the EPPM.

### *2.3.3. Danger control responses*

Attitude towards performing self-exams was measured by asking participants on a 7-point scale how useful, good, important, and effective they found self-exams (De Hoog, Stroebe & De Wit, 2008). Cronbach's alpha was high ( $\alpha = .88$ ).

Intention was measured with three items with a 7-point Likert scale ('In the next half year I will / intend to / plan to perform the self-exam monthly') following Fishbein and Ajzen (2010). Cronbach's alpha was high ( $\alpha = .96$ ).

### *2.3.4. Fear control responses*

McMahan, Witte and Meyer (1998) distinguish three different fear control responses: defensive avoidance, message minimization, and perceived manipulation. For defensive avoidance, two items were asked, based on McMahan et al. (1998): 'When I hear of breast cancer, I block this information' and 'I do not want to read about breast cancer' ( $\alpha = .85$ ,  $r = .74$ ). For message minimization, three items were presented, derived from McMahan et al. (1998), assessing to what extent the participants thought the story was 'exaggerated', 'overblown', or 'overstated' ( $\alpha = .91$ ). To measure to what extent participants felt manipulated, four questions were asked based on McMahan et al. (1998): 'the story is misleading', 'the story is distorted', 'the story tries to pressure me in a certain way' and 'the writer tries to manipulate me' ( $\alpha = .68$ ). The overall alpha for the nine items measuring fear control was .80.

### *2.3.5. Trait anxiety*

To measure the individual characteristic trait anxiety, Taylor's Manifest Anxiety Scale (MAS; 1953) and the State-Trait Anxiety Inventory (STAI; Spielberger, 1983) are often used. For reasons of brevity, four statements were chosen that can be found in both scales, namely: 'I am a nervous person', 'I feel that difficulties are piling up so that I cannot overcome them', 'I frequently find myself worrying about something' and 'I have many fears compared to my friends' ( $\alpha = .82$ ). Again, the response scale ranged from strongly disagree (1) to strongly agree (7).

## **3. Results**

### **3.1. Overview of analyses**

Pairwise correlations were calculated to test for the relationships between threat and danger control, and fear and fear control, as posited in proposition 2 respectively 6. In order to test proposition 7 and 12, a series of simple mediation analyses were performed using PROCESS (Hayes, 2013). In each analysis, first the total effect of the independent variable X on the outcome variable Y was determined. If the total effect was found to be significant, the two components of the total effect were assessed: the indirect effect ( $X \rightarrow M \rightarrow Y$ ) and the direct effect ( $X \rightarrow Y$ ). Hayes (2009) illustrates that, even when there is no significant total effect of X on Y, there may be an indirect effect of X on Y, for instance if one or more indirect paths carry the effect and those paths operate in opposite directions (p. 413-414). In this study, however, we were only interested in the possible decomposition of a total effect if such a total effect actually proved to exist.

The macro used to test the simple mediation models does not provide p-values for indirect effects. According to Hayes (2013), however, if the 95% bootstrap confidence interval does not contain and is entirely above zero, there is clear evidence that the indirect effect is positive to a statistically significant degree (p. 109). Similarly, if the 95% confidence interval does not contain and

is entirely below zero, there is clear evidence that the indirect effect is negative to a statistically significant degree. For reasons of brevity, we use the expression 'significant' in such cases.

### **3.2. Proposition 2: If efficacy is high, threat → danger control**

The EPPM assumes that when efficacy is high, threat corresponds to danger control. Although the level of perceived efficacy was quite high in this study (response efficacy:  $M = 5.59$ ,  $SD = 0.83$ ; self-efficacy:  $M = 4.83$ ,  $SD = 1.40$ ), threat and attitude proved not to be related ( $r(116) = .08$ ,  $p = .40$ ), nor were threat and intention ( $r(116) = .14$ ,  $p = .15$ ).

### **3.3. Proposition 6: Fear → fear control**

No significant correlation was found between fear and fear control ( $r(111) = .00$ ,  $p = .99$ ), nor between fear and the three separate fear control responses (defensive avoidance:  $r(112) = .12$ ,  $p = .22$ ; perceived manipulation:  $r(112) = .03$ ,  $p = .72$ ; message minimization:  $r(113) = -.11$ ,  $p = .27$ ).

### **3.4. Proposition 7: If efficacy is high, fear → threat → danger control**

The EPPM assumes that when efficacy is high, fear can only be *indirectly* related to attitude and intention, that is through threat. As the level of perceived efficacy was quite high in this study (see 3.2), we tested the mediation models depicted in Figures 2a, b and c. The number of bootstrap samples was set to 5,000, as suggested by Hayes.

For attitude as outcome variable, the total effect of fear on *attitude* was not significant ( $\beta = -.09$ ,  $p = .45$ ). The total effect of fear on *intention* was significant ( $\beta = .29$ ,  $p < .01$ ). No evidence was found, however, for the proposed indirect effect of fear on intention through threat. When each of

the components of threat were used as a possible mediator, the indirect effects were also not significant. A significant direct effect of fear on intention was found ( $\beta = .28, p < .01$ ).

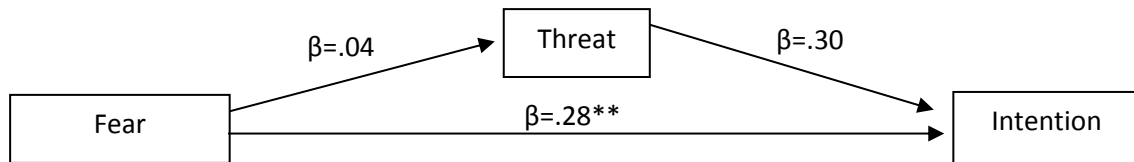


Figure 2a. Standardized regression coefficients. \* $p < .05$ , \*\* $p < .01$ . Total effect:  $\beta = .29^{**}$ .

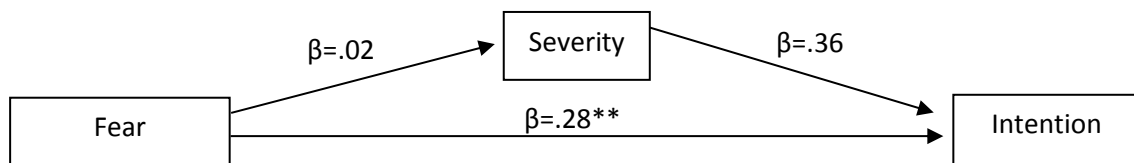


Figure 2b. Standardized regression coefficients. \* $p < .05$ , \*\* $p < .01$ . Total effect:  $\beta = .29^{**}$ .

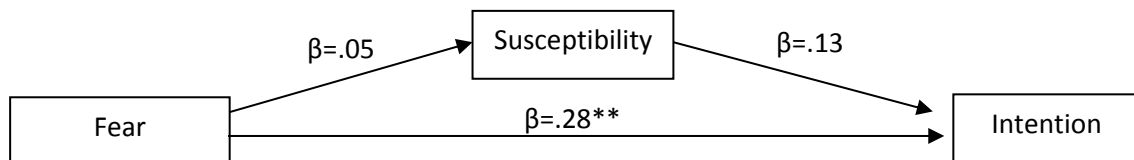


Figure 2c. Standardized regression coefficients. \* $p < .05$ , \*\* $p < .01$ . Total effect:  $\beta = .29^{**}$ .

### 3.5. Proposition 12: Trait anxiety → threat and efficacy → danger control and fear control

In order to examine whether trait anxiety influenced danger control (i.e. attitude and intention) or fear control through threat and efficacy, a parallel mediator model was tested. Again, the number of bootstrap samples was set to 5,000.

The total effect of trait anxiety on *attitude* was not significant ( $\beta = .18$ ,  $p = .06$ ). As Figure 3 illustrates, the total effect of trait anxiety on *intention* was significant ( $\beta = .26$ ,  $p < .01$ ). This effect was partly explained by the significant direct effect of trait anxiety on intention. Furthermore, a significant indirect effect of trait anxiety on intention through efficacy was found ( $\beta = .07$ ). However, there was no significant indirect effect of trait anxiety on intention through threat.

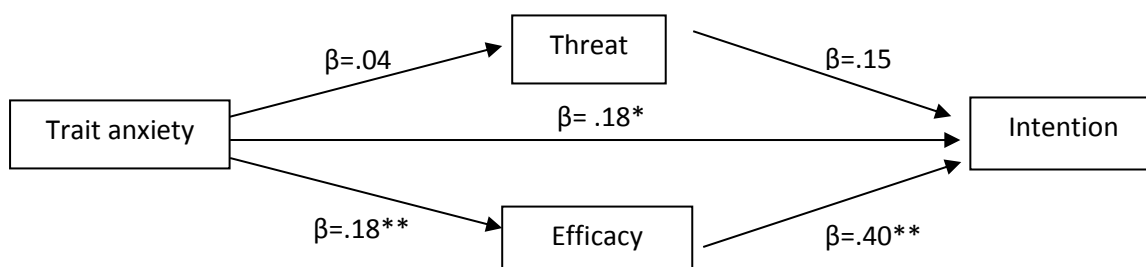


Figure 3. Standardized regression coefficients. \* $p < .05$ , \*\* $p < .01$ . Total effect:  $\beta = .26^{**}$ .

The total effect of trait anxiety on fear control<sup>2</sup> was not significant ( $\beta = .00$ ,  $p = .99$ ): trait anxiety did not prove to influence fear control.

<sup>2</sup> We also tested the mediation models for the fear control responses separately. We only found a significant total effect of trait anxiety on defensive avoidance ( $\beta = .19$ ). The direct effect of trait anxiety on defensive avoidance was also significant, just as the indirect effect through efficacy ( $\beta = -.07$ ). However, as the total effect for fear control was not significant, we consider these results as chance findings.

Table 2. Correlations and descriptive statistics for all variables

	Fear	Threat	Severity	Susceptibility	Efficacy	Self-efficacy	Response efficacy	Attitude	Intention	Fear control	Def. av.	Perc. man.	Mess. min.	Trait anxiety
<i>Fear</i>	-													
<i>Threat</i>	.06	-												
<i>Severity</i>	.06	.43**	-											
<i>Susceptibility</i>	.04	.93**	.08	-										
<i>Efficacy</i>	.01	.19*	.18	.14	-									
<i>Self-efficacy</i>	-.10	.13	.05	.12	.87**	-								
<i>Response efficacy</i>	.15	.19*	.26**	.10	.78**	.36**	-							
<i>Attitude</i>	-.07	.08	.03	.08	.09	.00	.16	-						
<i>Intention</i>	.25**	.14	.12	.10	.33**	.25**	.29**	.07	-					
<i>Fear control</i>	.00	-.26**	-.13	-.24**	-.35**	-.21*	-.38**	-.28**	-.25**	-				
<i>Defensive avoidance</i>	.12	-.13	-.03	-.13	-.17	-.14	-.16	-.09	.04	.44**	-			
<i>Perceived manipulation</i>	.03	-.18	-.08	-.17	-.26**	-.16	-.28**	-.23*	-.28**	.84**	.05	-		
<i>Message minimization</i>	-.11	-.28**	-.17	-.24**	-.32**	-.18	-.37**	-.28*	-.26**	.87**	.16	.62**	-	
<i>Trait anxiety</i>	.36**	.08	.20*	.00	.27**	.24*	.22*	-.18	.26**	.00	.18*	-.08	-.05	-
<i>M</i>	4.18	6.16	6.70	5.61	5.26	4.83	5.59	5.97	4.42	3.26	2.50	3.72	3.10	3.80
<i>SD</i>	1.19	0.68	0.49	1.23	0.89	1.40	0.83	1.40	1.35	0.97	1.42	1.11	1.47	1.37

Note. \* $p < .05$ , \*\* $p < .01$

### 3.5. Additional analyses

Additional exploratory analyses were conducted in an attempt to determine which variables were associated with danger control and fear control. Table 2 presents correlations and descriptive statistics for all variables.

No significant correlations were found between attitude and the concepts or the outcomes of the EPPM. Regression analyses with attitude as dependent variable produced no significant contribution of any of the threat or efficacy components.

A positive correlation between fear and the intention to perform self-exams was found ( $r(113) = .25, p < .01$ ), indicating that the more fear receivers experienced, the higher their intention was to perform a breast self-exam. Furthermore, self-efficacy and response efficacy were positively and significantly related to intention ( $r(116) = .25, p < .01$  and  $r(116) = .29, p < .01$ , respectively). Regression analysis with the components of threat and efficacy as predictors and intention as dependent variable showed that response efficacy was the only significant predictor of intention (see Table 3). The contribution of self-efficacy was marginally significant ( $\beta = .17, p = .08$ ).

Table 3. Results regression analysis with intention as dependent variable

Predictor	b	SE b	$\beta$	Sig.
Severity	0.15	0.26	.06	.55
Susceptibility	0.06	0.10	.06	.54
Response efficacy	0.33	0.16	.21	.04
Self-efficacy	0.16	0.09	.17	.08

Note.  $R^2 = .12$  ( $p < .01$ ).

Finally, both attitude and intention were negatively and significantly related with fear control ( $r(115) = -.28, p < .01$  respectively  $r(115) = -.25, p < .01$ ), specifically with perceived manipulation ( $r(115) = -.23, p < .05$  respectively  $r(115) = -.28, p < .01$ ) and message minimization ( $r(116) = -.28, p < .05$  respectively  $r(116) = -.26, p < .01$ ): the more receivers perceived the message as exaggerating or manipulating, the less they thought self-exams are good and the less they reported they were actually planning to perform the self-exam.

#### 4. Discussion

The Extended Parallel Process Model (1992, 1998) is based on twelve propositions. Popova (2012) showed that several propositions received mixed support or were tested only minimally. This study aimed to test four propositions for which mixed support was found.

Of these four propositions, only one proposition received some support in this study, namely the one concerning the role of individual characteristics. According to Witte (1998), individual characteristics may only influence outcomes *indirectly*, as mediated by perceived threat and efficacy (proposition 12). In our study, trait anxiety proved to influence intention, as a total effect of trait anxiety on intention was found. This effect was explained by an indirect effect of trait anxiety on intention through *efficacy*, as the EPPM claims, but *threat* did not prove to mediate the effect of trait anxiety on intention. Trait anxiety was found to also be significantly and directly related to intention, which contradicts the proposition and also differs from what Witte and Morrison (2000) report. They found that one's level of anxiety did influence threat and efficacy, but trait anxiety did not influence attitudes or intentions. With regard to fear control, our results did not support the proposition: there was no significant total effect of trait anxiety on fear control responses.

The results with regard to the three remaining propositions we tested were also not in line with the EPPM. It was found that neither perceived severity nor perceived susceptibility was correlated with fear or danger control. This finding contradicts proposition 2 that assumes threat and



intention to be related. Furthermore, proposition 6 was not supported in this study, as fear was not related to fear control responses. Finally, no evidence was found for an indirect effect of fear on intention through threat, which contradicts proposition 7 of the EPPM.

We did find that fear directly and positively influenced the intention to perform a breast self-exam, which is promising for the effectiveness of fear appeals. Our study further suggests that efficacy plays a more important role than threat in the persuasive effects of fear appeals, as both components of efficacy appeared to correlate positively with intention, while both components of threat did not. Apparently, the more receivers perceive a recommended action as effective and feasible, the more likely it is that they actually plan to perform the action. Ruiter, Kessels, Peters and Kok (2014) also conclude that efficacy is more important than threat, after they summarized several meta-analyses on fear appeals. Additionally, Rintamaki and Yang (2013) demonstrated that the inclusion of response costs (i.e. perceived drawbacks associated with a behavior), along with the efficacy components, improved the predictive power of the EPPM, which should be further researched.

A number of limitations must be acknowledged. First, this study was set up as a correlational study, which made it impossible to test the propositions that include causal relations. For this goal, experimental research is needed. Second, the results are based on one story addressing one specific health theme, namely breast cancer, aimed at only females. Another story, health theme or audience might have led to different results. Future research could address this limitation by using different stories on different health topics for different audiences.

In conclusion, little support was found for the propositions of the EPPM, which – again – questions the appropriateness of the EPPM. Other researchers, for instance Rintamaki and Yang (2013) and So (2013), suggest to revise the EPPM by including more variables to the model or by scrutinizing the proposed relationships between the EPPM-variables. That might be a good idea indeed.

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## Appendix A

	<b>Propositions of the EPPM as formulated by Witte (1998, p. 439)</b>
1	When perceived threat is low, regardless of perceived efficacy level, there will be no further processing of the message
2*	As perceived threat increases when perceived efficacy is high, so will message acceptance
3	Cognitions about threat and efficacy cause attitude, intention, or behavior changes (i.e., danger control responses)
4	As perceived threat increases when perceived efficacy is low, people will do the opposite of what is advocated
5	As perceived threat increases when perceived efficacy is moderate, message acceptance will first increase, and then decrease, resulting in an inverted U-shaped function
6*	Fear causes fear control responses (i.e. message threat → perceived threat → fear → fear control responses (Witte, 1992, p. 343))
7*	When perceived efficacy is high, fear indirectly influences danger control outcomes, as mediated by perceived threat
8	When perceived efficacy is high, there is a reciprocal relationship between perceived threat and fear
9	Cognitions about efficacy are unrelated to fear control responses
10	Cognitions about threat are indirectly related to fear control responses
11	Perceived threat determines the intensity of a response (how strong the response) and perceived efficacy determines the nature of the response (either fear or danger control)
12*	Individual differences influence outcomes indirectly, as mediated by perceived threat and efficacy

\* examined in this study

## **Appendix B**

My name is Myrthe. I'm 22 years old and I study law at the University of Groningen. At this point in my life, I thought I had everything under control—I had a great boyfriend, solid job prospects, a nice apartment, lots of money, and loyal friends. What I didn't have under control was developing cancer. But not just any cancer, breast cancer to be specific. I knew it is the most common cancer among women, but I had no clue that young women could also get it. I started having some pain in my left breast. After about a month, I finally went to the doctor because my mother made me go. To my horror, he found cancer.

### **Metastasized**

Only one week after the diagnosis, my left breast was removed. But that didn't stop the misery. I could no longer have sex with my boyfriend because I didn't feel like it. With only one breast, I was so embarrassed. We broke up last week. I dropped out of my college, fraternity, and hockey team, mainly because I didn't have any energy left and because my so-called friends started treating me different. The chemotherapy made me lose my hair, and I feel sick all the time. But that's not all. The really bad news is that the cancer has spread out to my liver, and the doctor gives me only a small chance of beating it. I keep thinking, I'm only 22 years old, this isn't supposed to be happening!

### **Too afraid**

If I had discovered the tumor earlier, I might have really improved my chances of beating cancer. I had heard of the breast self-exam to check for tumors, but I was afraid to find something. None of my girlfriends ever talked about it, and I guess none of them did the exam either. Now, what do I have to show for my scared attitude? No boyfriend, no sex, no hair, and barely any friends. And I'm terminally ill.

Perhaps I won't survive.

**Better early than (too) late**

Dear reader, don't make my mistake. Don't let your fear keep you from doing the self-exam. It's really simple: once a month, a week after your menstruation, feel around the entire breast area in circular motions. Feel for any hard lumps. If you have pain in your breasts, or if you find a lump, go see your doctor immediately. He tells me there is a big chance of survival if it's caught early.

Learn the BSE and do it once a month. It will save your life!